

A Comparison of NLCD 2011 and LANDFIRE EVT 2010: Regional and National Summaries.

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Abstract

In order to provide the land cover user community a summary of the similarities and differences between the 2011 National Land Cover Dataset (NLCD) and the Landscape Fire and Resource Management Planning Tools Program Existing Vegetation 2010 Data (LANDFIRE EVT), the two datasets were compared at national (conterminous U.S.) and regional (Eastern, Midwestern, and Western) extents (Figure 1). The comparisons were done by generalizing the LANDFIRE data to be consistent with mapped land cover classes in the NLCD (i.e., cross-walked). Summaries of the comparisons were based on areal extent including 1) the total extent of each land cover class, and 2) land cover classes in corresponding 900-m² areas. The results from the comparisons provide the user community information regarding the utility of both datasets relative to their intended uses.

Introduction

Datasets describing land cover are utilized for various applications (for example, land management, climate, environmental planning; Wickham and others 2014). The NLCD contains 16-land cover classes provided at a 30-meter pixel size and produced every five-years (Homer and others 2015). The LANDFIRE EVT dataset is a high thematic resolution dataset with nearly 600 land cover classes for the conterminous U.S. that are mapped at a 30-meter resolution and updated on a biennial basis (Nelson et al. 2013). The EVT data are central to fire planning, as well as conservation planning applications.

The comparison presented here was intended to inform end-users and present a summary of two different land cover datasets in the context of a question: Are the NLCD and LANDFIRE EVT data representing the same landscapes in a similar way? Specifically, this analysis addresses two distinct questions: 1) Are the areal estimates, the mapped amount of each land cover, comparable in the two datasets and 2) Do the two maps agree with respect to where the land cover classes are mapped?

Methods

In order to compare the land cover classes from the two datasets, two analyses were conducted. The first is the basic comparison of the area of each general land cover class based on the NLCD map legend as represented in each map. Prior to comparing the two maps the map legend from the LANDFIRE EVT map needed to be cross-walked to the 16 land cover classes represented in the NLCD 2011 map. A summary of the definitions used by each program for the general land cover classification are provide in Table 1 and the full crosswalk of each of the 850 LANDFIRE classes to the NLCD classification is provided in Appendix 1. The crosswalk was developed through expert opinion; specifically, the expert identified an NLCD class for each LANDFIRE EVT class. Once completed the number of pixels for each of the 16 land cover classes was summarized and converted to an aerial extent and percentage of each study area. The second analysis is spatially explicit comparisons of the two maps accomplished by overlaying the two maps and summarizing the area that is represented by each of the unique combinations of the NLCD and LANDFIRE EVT land cover classes. For the spatially explicit analysis the EVT were reclassified to the 16 land cover classes and then combined with the NLCD for GIS analysis. The resulting table was used to calculate the agreement between the two maps. The results are summarized for the conterminous U.S., as well as the Eastern, Midwestern, and Western regions by area (km^2) and percentage of the study area.

Results

Comparison in Areal Extent

The results of the national comparison in area mapped by class are provided in Table 2. At a national extent, forests, agriculture, and shrub/scrub classes are the most prevalent land cover. The largest disagreement in areal extent occurred in the shrub/scrub class. There was a 5.38 percent difference with 1,746,276 km^2 of shrub/scrub in the NLCD map and 1,311,412 km^2 in the LANDFIRE EVT data. The next largest difference is the amount of mixed forest, 161,861 km^2 in NLCD and 386,578 km^2 in the LANDFIRE EVT. Differences in the Medium Intensity Developed, 55,131 km^2 in NLCD versus 229,472 km^2 in the LANDFIRE EVT represent the third largest difference at the national extent. The discrepancies in shrub/scrub are likely the results of differences in the concept of shrub versus forests between the two legends. The NLCD shrub definition is based solely on height and includes true forest types that are regenerating, while the LANDFIRE definition is primarily based upon species. Because of this, LANDFIRE mapped less shrub/scrub and more of the three forested classes. The difference in the amount of medium intensity developed is likely due to spatial processing of pixels adjacent to roads into this cover class. Roads are an important landscape feature in fire and fuels modeling, therefore in the LANDFIRE mapping effort a roads dataset was used to reclassify pixels adjacent to roads to the

medium intensity developed class. In the NLCD those pixels may not have reached the impervious surface threshold (50-79 percent) necessary to be classified as medium intensity developed.

The comparison for the Eastern Region study area is provided in Table 3. In this region, forest and agriculture are the predominant cover classes. The extent of urban coverage is more extensive with nearly 240,000 km² mapped as developed in the NLCD dataset. The largest differences between the two maps in this region are the mixed forest, medium intensity developed and shrub/scrub in that order. LANDFIRE EVT has 276,641 km² mixed forest compared to 117,888 km² in the NLCD.

Table 4 provides the results of the areal comparison for the Midwestern Region study area. In general, the agreement between the NLCD and LANDFIRE EVT map is high in the Midwest with the greatest differences in the region occurring in the shrub/scrub, medium intensity developed, and herbaceous classes. NLCD mapped more shrub/scrub, a difference of 60,037 km² and about the same area (57,182 km²) ? herbaceous. Post-processing of pixels adjacent to roads explains the increase in medium intensity developed land in the LANDFIRE map.

In the Western region the most abundant land cover classes include shrub/scrub and forest which together make up greater than 65 percent of the area (Table 5). The largest differences between the two maps occur in the shrub/scrub, evergreen forest, and the barren land classes. LANDFIRE EVT includes more evergreen forests (112,232 km²; 3.97 percent) and less shrub/scrub (288,133 km²; 10.20 percent) than in the NLCD map.

Spatially Explicit Comparisons (Pixel to Pixel)

Results from the pixel to pixel comparisons of the NLCD 2011 and LANDFIRE EVT 2010 are reported in Tables 6 – 13. When comparing the LANDFIRE EVT map cross-walked to the NLCD classes for the conterminous U.S. the agreement is 69.05 percent (Tables 6 and 7). The greatest differences between the two datasets are between LANDFIRE EVT shrub/scrub and NLCD herbaceous (194,864 km²; 2.41 percent) and the LANDFIRE EVT Evergreen Forest and NLCD shrub/scrub (182,292 km²; 2.26 percent). Other disagreements occurred where LANDFIRE mapped Mixed Forest and NLCD mapped Evergreen Forest (131,256 km²; 1.62 percent), and LANDFIRE Medium Intensity Developed and NLCD Open Space Developed (121,300 km²; 1.50 percent).

In each study area, there were differences between the LANDFIRE Medium Intensity Developed and the NLCD's Open Space Developed due to the post-processing steps used by LANDFIRE to reclassify pixels near roads. That difference represents 121,300 km² (1.50 percent) of the total area for the conterminous U.S.; 59,098 km² (2.30 percent) in the East; 46,012 km² (1.71 percent) in the Midwest; and 16,190 km² (0.57 percent) in the West (Tables 6-13).

In the East, the largest differences occurred between LANDFIRE's Evergreen Forest and NLCD's Deciduous Forest (98,133 km²; 3.82 percent) and Mixed Forest (68,551 km²; 2.67 percent). At the same time some of NLCD's Evergreen (36,112 km²; 1.41 percent) and Mixed Forest (43,831 km²; 1.71 percent) were classified as Deciduous in the LANDFIRE Map. Overall spatial and general thematic agreement in the Eastern region was 66.75 percent.

In the Midwestern region, overall agreement between the two maps was higher (73.63 percent). Here the largest differences were seen in the shrub/scrub and herbaceous cover classes (Tables 10 and 11). LANDFIRE mapped herbaceous cover where NLCD mapped cultivated cropland ($65,467 \text{ km}^2$; 2.44 percent) and pasture/hay ($41,285 \text{ km}^2$; 1.54 percent). In other areas LANDFIRE's cultivated cropland corresponded to NLCD's pasture/hay ($48,647 \text{ km}^2$; 1.81 percent) and herbaceous ($45,235 \text{ km}^2$; 1.68 percent). Another $45,852 \text{ km}^2$ (1.71 percent) of the same region was mapped as herbaceous by NLCD and shrub/scrub by LANDFIRE.

The largest differences in the Western region occurred in the classification of shrub/shrub and herbaceous and evergreen forests and shrub/scrub (Tables 12 and 13). In both maps the dominate land cover class is the shrub/scrub class (NLCD 45.78 percent; LANDFIRE EVT 35.58 percent). $211,834 \text{ km}^2$ (7.50 percent) are mapped as herbaceous in the LANDFIRE map and as scrub/shrub in NLCD. Another $148,016 \text{ km}^2$ (5.24 percent) were mapped by LANDFIRE as scrub/shrub where NLCD classified the pixels as herbaceous. Finally, in the Western region $144,561 \text{ km}^2$ (5.12 percent) was mapped as Evergreen Forest by LANDFIRE and as shrub/scrub by NLCD.

Conditional Probabilities

In addition to reporting the percentage of the agreement by class the conditional probabilities for each of the study areas were calculated and provided (Table 14-20). For each area two summaries are provided, one in which the probabilities are conditioned on the row totals (the number of pixels mapped by NLCD as a specific class) and one conditioned on the column totals (the number of pixels mapped by LANDFIRE as a specific class). In other words, in Table 14 where the probabilities are conditioned on the rows, the second row represents the probability that a class mapped by NLCD as water was mapped as a specific class by LANDFIRE. In the case of the national summary (Table 14) 97.92 percent of the pixels mapped by NLCD as water were also mapped by LANDFIRE as water. Similarly, in Table 15, the probabilities are conditioned on the columns. Column 2 represents the probability of a class mapped as open water by LANDFIRE being mapped to a specific class by NLCD. In this case, the probability that pixels mapped by LANDFIRE as open water were also mapped by NLCD as open water is 94.75 percent. Tables 16-20 provide the same conditional probability information for each of the three subregions (East, West, and Midwest).

Conclusion

The comparison presented here was intended to inform end-users and present a summary of two different land cover datasets in the context of a question: Are the NLCD and LANDFIRE EVT data representing the same landscapes in a similar way? Specifically, this analysis addresses two distinct questions: 1) Are the areal estimates, the mapped amount of each land cover, comparable in the two datasets and 2) Do the two maps agree with respect to where the land cover classes are mapped?

In general, the comparison NLCD and LANDFIRE land cover indicate discrepancies related to differences in structure (for example, scrub/scrub versus forest in the west, scrub/shrub versus herbaceous in the Midwest), phenology (for example, evergreen versus mixed forest), or definition (for example, open space developed pixels in NLCD being re-classed to Medium Intensity Developed

for pixels proximal to roads). The crosswalk, definitions, and summaries provided in this report are intended to provide data for informing users' applications and interest. The analyses summarized here were completed for four geographic extents thought to be relevant to a broad audience. Similar analyses can be completed for user defined areas of interest in order to better understand how the two datasets compare with respect to characterizing the landscape. At the same time the differences are an important indicator to the mapping programs about the geographies and specific cover classes that warrant special attention and the importance of acknowledging and documenting subtle differences in map class definitions.



Figure 1. Study area map of the conterminous U.S. and the three subregions (West, Midwest, and East).

Table 1. General Land Cover Map Units Names and Definitions for National Land Cover Database and LANDFIRE. Bold text indicates differences between the two programs definitions.

Land Use - Land Cover Class	NLCD Definition	LANDFIRE Definition
11 Open Water	Areas of open water, generally with less than 25% cover of vegetation or soil	Areas of open water, generally with less than 25% cover of vegetation or soil
12 Perennial Snow/Ice	Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover	Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover
21 Developed, Open Space	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22 Developed, Low Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23 Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units and may also include developed roads .
24 Developed, High Intensity	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
31 Barren Land	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 10% of total cover.
41 Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	Areas dominated by trees generally greater than 10% of total tree cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

Land Use - Land Cover Class	NLCD Definition	LANDFIRE Definition
42 Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	Areas dominated by trees generally greater than 10% of total tree cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43 Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	Areas dominated by trees generally greater than 10% of total tree cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
52 Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	Areas dominated by shrubs greater than 10% of total shrub cover and less than 10% tree cover.
71 Herbaceous	Areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	Areas dominated by gramanoid or herbaceous vegetation generally greater than 10% of total herb cover and less than 10% tree cover and and less than 10% shrub cover.
81 Hay/Pasture	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
82 Cultivated Crops	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
90 Woody Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	Areas where forest or shrubland vegetation accounts for greater than 10% of vegetative cover and the forest and shrubland vegetation indicate that soil and/or substrate is periodically saturated with or covered with water.
95 Emergent Herbaceous Wetlands	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the perennial herbaceous vegetation indicate soil or substrate is periodically saturated with or covered with water.

Table 2. Comparison of Areal Extent of NLCD and LANDFIRE EVT.

Code	Class	NLCD	LANDFIRE	Difference			
		km ²	%	km ²	%		
0	Boundary Difference	2,726	0.03	0	0.00	2,726	0.03
11	Open Water	420,227	5.20	434,327	5.37	-14,100	-0.17
12	Ice	1,439	0.02	1,737	0.02	-297	0.00
	Water/Ice	421,666	5.22	436,064	5.40	-14,397	-0.18
21	Developed, Open Space	263,246	3.26	151,268	1.87	111,977	1.39
22	Developed, Low Intensity	117,712	1.46	68,110	0.84	49,602	0.61
23	Developed, Med. Intensity	55,131	0.68	229,472	2.84	-174,341	-2.16
24	Developed, High Intensity	18,164	0.22	13,925	0.17	4,239	0.05
	Developed	454,253	5.62	462,775	5.73	-8,522	-0.11
31	Barren Land	99,463	1.23	194,304	2.40	-94,841	-1.17
41	Deciduous Forest	876,257	10.84	931,015	11.52	-54,758	-0.68
42	Evergreen Forest	934,123	11.56	986,512	12.21	-52,389	-0.65
43	Mixed Forest	161,861	2.00	386,578	4.78	-224,717	-2.78
	Forest	1,972,242	24.41	2,304,105	28.51	-331,863	-4.11
52	Shrub/Scrub	1,746,336	21.61	1,311,412	16.23	434,924	5.38
71	Herbaceous	1,176,276	14.56	1,282,526	15.87	-106,250	-1.31
81	Hay/Pasture	537,512	6.65	466,865	5.78	70,647	0.87
82	Cultivated Crop Land	1,252,998	15.51	1,226,162	15.17	26,836	0.33
	Agricultural Crop	1,790,510	22.16	1,693,027	20.95	97,482	1.21
90	Woody Wetlands	312,431	3.87	329,821	4.08	-17,390	-0.22
95	Emergent Wetlands	104,975	1.30	66,843	0.83	38,132	0.47
	Wetland	417,406	5.17	396,664	4.91	20,742	0.26
	Total	8,080,876	100.00	8,080,876	100.00		

Table 3. Comparison of Areal Extent of NLCD and LANDFIRE EVT for the Eastern U.S.

Code	Class	NLCD		LANDFIRE		Difference	
		km ²	%	km ²	%	km ²	%
	Boundary Difference	2,060	0.08	0	0.00	2,060	0.08
11	Open Water	181,675	7.07	187,995	7.32	-6,320	-0.25
12	Ice	0	0.00	0	0.00	0	0.00
	Water/Ice	181,675	7.07	187,995	7.32	-6,320	-0.25
21	Developed, Open Space	134,005	5.21	81,033	3.15	52,972	2.06
22	Developed, Low Intensity	67,718	2.64	39,347	1.53	28,371	1.10
23	Developed, Med. Intensity	27,745	1.08	117,874	4.59	-90,129	-3.51
24	Developed, High Intensity	9,902	0.39	7,620	0.30	2,282	0.09
	Developed	239,371	9.32	245,875	9.57	-6,504	-0.25
31	Barren Land	9,151	0.36	9,828	0.38	-677	-0.03
41	Deciduous Forest	645,917	25.14	682,415	26.56	-36,498	-1.42
42	Evergreen Forest	262,545	10.22	208,251	8.10	54,294	2.11
43	Mixed Forest	117,888	4.59	276,641	10.77	-158,753	-6.18
	Forest	1,026,350	39.94	1,167,307	45.43	-140,957	-5.49
52	Shrub/Scrub	114,191	4.44	28,016	1.09	86,174	3.35
71	Herbaceous	66,341	2.58	61,479	2.39	4,862	0.19
81	Hay/Pasture	293,287	11.41	286,008	11.13	7,279	0.28
82	Cultivated Crop Land	378,944	14.75	357,728	13.92	21,216	0.83
	Agricultural Crop	672,231	26.16	643,736	25.05	28,495	1.11
90	Woody Wetlands	207,280	8.07	190,933	7.43	16,347	0.64
95	Emergent Wetlands	51,012	1.99	34,494	1.34	16,518	0.64
	Wetland	258,292	10.05	225,427	8.77	32,866	1.28
	Total	2,569,663	100.00	2,569,663	100.00		

Table 4. Comparison of Areal Extent of NLCD and LANDFIRE EVT for the Midwestern U.S.

Code	Class	NLCD		LANDFIRE		Difference	
		km ²	%	km ²	%	km ²	%
0	Boundary Difference	95	0.00	0	0.00	95	0.00
11	Open Water	186,143	6.93	188,473	7.02	-2,330	-0.09
12	Ice	0	0.00	0	0.00	0	0.00
	Water/Ice	186,143	6.93	188,473	7.02	-2,330	-0.09
21	Developed, Open Space	93,061	3.46	49,522	1.84	43,538	1.62
22	Developed, Low Intensity	30,105	1.12	16,880	0.63	13,226	0.49
23	Developed, Med. Intensity	13,470	0.50	73,184	2.72	-59,714	-2.22
24	Developed, High Intensity	4,843	0.18	3,764	0.14	1,079	0.04
	Developed	141,479	5.27	143,350	5.34	-1,871	-0.07
31	Barren Land	9,396	0.35	12,060	0.45	-2,664	-0.10
41	Deciduous Forest	187,324	6.97	210,987	7.85	-23,663	-0.88
42	Evergreen Forest	49,575	1.85	44,026	1.64	5,549	0.21
43	Mixed Forest	20,163	0.75	72,140	2.69	-51,977	-1.93
	Forest	257,061	9.57	327,152	12.18	-70,091	-2.61
52	Shrub/Scrub	338,624	12.61	277,987	10.35	60,637	2.26
71	Herbaceous	697,056	25.95	754,238	28.08	-57,182	-2.13
81	Hay/Pasture	197,100	7.34	151,577	5.64	45,523	1.69
82	Cultivated Crop Land	730,516	27.20	724,006	26.95	6,509	0.24
	Agricultural Crop	927,616	34.53	875,584	32.60	52,032	1.94
90	Woody Wetlands	87,914	3.27	78,364	2.92	9,550	0.36
95	Emergent Wetlands	40,746	1.52	28,922	1.08	11,825	0.44
	Wetland	128,660	4.79	107,286	3.99	21,375	0.80
	Total	2,686,130	100.00	2,686,130	100.00		

Table 5. Comparison of Areal Extent of NLCD and LANDFIRE EVT for the Western U.S.

Code	Class	NLCD		LANDFIRE		Difference	
		km ²	%	km ²	%	km ²	%
0	Boundary Difference	571	0.02	0	0.00	571	0.02
11	Open Water	52,409	1.86	57,859	2.05	-5,450	-0.19
12	Ice	1,439	0.05	1,737	0.06	-297	-0.01
	Water/Ice	53,848	1.91	59,596	2.11	-5,748	-0.20
21	Developed, Open Space	36,180	1.28	20,713	0.73	15,467	0.55
22	Developed, Low Intensity	19,888	0.70	11,883	0.42	8,006	0.28
23	Developed, Med. Intensity	13,916	0.49	38,414	1.36	-24,498	-0.87
24	Developed, High Intensity	3,419	0.12	2,541	0.09	879	0.03
	Developed	73,403	2.60	73,550	2.60	-147	-0.01
31	Barren Land	80,916	2.86	172,415	6.10	-91,500	-3.24
41	Deciduous Forest	43,016	1.52	37,612	1.33	5,404	0.19
42	Evergreen Forest	622,004	22.02	734,236	25.99	-112,232	-3.97
43	Mixed Forest	23,810	0.84	37,797	1.34	-13,988	-0.50
	Forest	688,830	24.38	809,646	28.66	-120,816	-4.28
52	Shrub/Scrub	1,293,521	45.79	1,005,408	35.59	288,113	10.20
71	Herbaceous	412,879	14.61	466,809	16.52	-53,930	-1.91
81	Hay/Pasture	47,125	1.67	29,280	1.04	17,845	0.63
82	Cultivated Crop Land	143,538	5.08	144,427	5.11	-890	-0.03
	Agricultural Crop	190,663	6.75	173,708	6.15	16,955	0.60
90	Woody Wetlands	17,237	0.61	60,524	2.14	-43,287	-1.53
95	Emergent Wetlands	13,216	0.47	3,427	0.12	9,789	0.35
	Wetland	30,453	1.08	63,952	2.26	-33,499	-1.19
	Total	2,825,084	100.00	2,825,084	100.00		

Table 6. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Conterminous U.S. (Area in Km²).

NLCD Map Classes	LANDFIRE EVT Map Classes Cross-walked to NLCD Legend (km ²)																	Total
	0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
0	2,726	0	0	0	0	0	0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2,726
11	0	411,483	1	67	51	34	10	1,162	424	465	279	598	1,133	354	1,015	1,367	1,785	420,227
12	0	<1	1,439	0	0	0	0	<1	0	<1	0	<1	<1	0	0	0	0	1,439
21	0	446	<1	141,077	0	121,300	0	423	0	0	0	0	0	0	0	0	0	263,246
22	0	236	<1	4,199	66,900	46,056	0	320	0	0	0	0	0	0	0	0	0	117,712
23	0	189	<1	0	0	54,594	0	349	0	0	0	0	0	0	0	0	0	55,131
24	0	96	<1	0	0	4,089	13,809	170	0	0	0	0	0	0	0	0	0	18,164
31	0	3,612	189	156	125	128	62	88,985	1,047	752	439	650	1,907	438	558	304	111	99,463
41	0	1,196	<1	1,041	94	654	2	1,070	698,497	25,538	88,390	10,765	13,120	3,166	3,857	27,294	1,573	876,257
42	0	959	5	458	64	370	1	5,488	51,111	656,348	131,256	19,426	31,819	1,001	957	34,327	533	934,123
43	0	259	<1	181	22	174	<1	127	54,702	34,605	56,883	1,518	2,693	148	251	10,115	183	161,861
52	0	1,496	19	613	87	543	4	76,569	35,632	182,295	56,255	1,034,411	295,226	9,861	18,799	32,894	1,632	1,746,336
71	0	1,393	82	603	173	224	10	17,729	26,562	39,993	23,614	194,864	771,852	21,678	57,491	11,733	8,275	1,176,276
81	0	359	<1	1,135	229	647	12	370	17,196	1,967	1,388	20,823	59,693	323,365	109,456	637	236	537,512
82	0	1,065	<1	1,006	232	432	11	728	11,118	1,331	1,030	17,836	87,509	103,839	1,025,808	732	321	1,252,998
90	0	2,850	<1	597	62	191	1	369	30,331	38,589	25,462	6,357	7,305	1,021	2,442	189,411	7,440	312,431
95	0	5,961	<1	135	70	36	3	445	4,394	4,630	1,582	4,164	10,270	1,995	5,528	21,007	44,755	104,975
Total	0	434,327	1,737	151,268	68,110	229,472	13,925	194,304	931,015	986,512	386,578	1,311,412	1,282,526	466,865	1,226,162	329,821	66,843	8,086,876

Sum on the diagonal = 5,579,618 km² of the total 8,080,876 km² (69.05%) for the conterminous U.S.

Table 7. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Conterminous U.S. (Percent).

LANDFIRE EVT Map Classes Cross-walked to NLCD (%)																			Total
	0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95		
0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Total 0.03	
11	0.00	5.09	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.02	0.02	5.20	
12	0.00	<0.01	0.02	0.00	0.00	0.00	0.00	<0.01	0.00	<0.01	0.00	<0.01	<0.01	0.00	0.00	0.00	0.00	0.02	
21	0.00	0.01	<0.01	1.75	0.00	1.50	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	3.26	
22	0.00	<0.01	<0.01	0.05	0.83	0.57	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.46	
23	0.00	<0.01	<0.01	0.00	0.00	0.68	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	
24	0.00	<0.01	<0.01	0.00	0.00	0.05	0.17	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	
31	0.00	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	1.10	0.01	0.01	0.01	0.01	0.02	0.01	0.01	<0.01	<0.01	1.23	
41	0.00	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	8.64	0.32	1.09	0.13	0.16	0.04	0.05	0.34	0.02	10.84	
42	0.00	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.07	0.63	8.12	1.62	0.24	0.39	0.01	0.01	0.42	0.01	11.56	
43	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	0.68	0.43	0.70	0.02	0.03	<0.01	<0.01	0.13	<0.01	2.00	
52	0.00	0.02	<0.01	0.01	<0.01	0.01	<0.01	0.95	0.44	2.26	0.70	12.80	3.65	0.12	0.23	0.41	0.02	21.61	
71	0.00	0.02	<0.01	0.01	<0.01	<0.01	<0.01	0.22	0.33	0.49	0.29	2.41	9.55	0.27	0.71	0.15	0.10	14.56	
81	0.00	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	0.21	0.02	0.02	0.26	0.74	4.00	1.35	0.01	<0.01	6.65	
82	0.00	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.14	0.02	0.01	0.22	1.08	1.29	12.69	0.01	<0.01	15.51	
90	0.00	0.04	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.38	0.48	0.32	0.08	0.09	0.01	0.03	2.34	0.09	3.87	
95	0.00	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.05	0.06	0.02	0.05	0.13	0.02	0.07	0.26	0.55	1.30
Total	0.00	5.37	0.02	1.87	0.84	2.84	0.17	2.40	11.52	12.21	4.78	16.23	15.87	5.78	15.17	4.08	0.83	100.00	

Sum on the Diagonal = 69.05%

Table 8. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Eastern U.S. (Area in km²).

		LANDFIRE EVT Map Classes Cross-walked to the NLCD Legend																
		0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	Total
NLCD Map Classes	0	0	2,060	0	0	0	0	0	<1	<1	0	0	0	0	<1	<1	2,060	
	11	0	178,068	48	41	28	9	294	231	293	200	53	127	174	337	654	1,120	181,675
	21	0	219	74,437	0	59,098	0	252	0	0	0	0	0	0	0	0	0	134,005
	22	0	149	2,646	38,415	26,288	0	220	0	0	0	0	0	0	0	0	0	67,718
	23	0	115	0	0	27,427	0	203	0	0	0	0	0	0	0	0	0	27,745
	24	0	62	0	0	2,204	7,523	114	0	0	0	0	0	0	0	0	0	9,902
	31	0	1,004	108	90	97	53	4,647	932	318	364	64	630	293	300	162	89	9,151
	41	0	751	668	78	501	2	862	533,537	14,028	68,551	1,451	6,448	2,227	2,292	14,299	223	645,917
	42	0	312	327	60	329	1	565	36,112	102,821	98,133	1,322	7,273	941	709	13,426	213	262,545
	43	0	164	135	20	163	0	83	43,831	17,688	47,101	334	1,209	122	171	6,822	45	117,888
	52	0	214	355	73	476	3	674	18,140	30,241	36,176	5,691	8,070	5,533	2,631	5,576	338	114,191
	71	0	176	323	113	144	8	814	12,918	9,468	13,597	996	13,195	8,883	3,796	1,535	377	66,341
	81	0	182	789	177	574	10	249	12,307	1,542	1,243	8,609	11,745	213,135	42,312	364	49	293,287
	82	0	613	667	166	357	9	425	5,307	1,008	831	6,022	6,735	53,179	303,051	508	65	378,944
	90	0	1,241	417	52	157	1	247	18,059	27,542	9,381	2,687	3,968	581	1,218	137,939	3,790	207,280
	95	0	2,664	114	62	31	3	180	1,042	3,303	1,064	788	2,078	940	911	9,647	28,185	51,012
Total		0	187,995	81,033	39,347	117,874	7,620	9,828	682,415	208,251	276,641	28,016	61,479	286,008	357,728	190,933	34,494	2,569,663

Sum on the Diagonal 1,715,170 km² of the 2,569,663 km² (66.75%).

Table 9. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Eastern U.S. (Percent).

NLCD Map Classes	LANDFIRE EVT Map Classes Cross-walked to NLCD															Total	
	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
0	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
11	0.00	6.93	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01	0.01	<0.01	<0.01	0.01	0.01	0.03	0.04	7.07
21	0.00	0.01	2.90	0.00	2.30	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.21
22	0.00	0.01	0.10	1.49	1.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.64
23	0.00	<0.01	0.00	0.00	1.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08
24	0.00	<0.01	0.00	0.00	0.09	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
31	0.00	0.04	<0.01	<0.01	<0.01	<0.01	0.18	0.04	0.01	0.01	<0.01	0.02	0.01	0.01	0.01	<0.01	0.35
41	0.00	0.03	0.03	<0.01	0.02	<0.01	0.03	20.76	0.55	2.67	0.06	0.25	0.09	0.09	0.56	0.01	25.14
42	0.00	0.01	0.01	<0.01	0.01	<0.01	0.02	1.41	4.00	3.82	0.05	0.28	0.04	0.03	0.52	0.01	10.22
43	0.00	0.01	0.01	<0.01	0.01	0.00	0.00	1.71	0.69	1.83	0.01	0.05	<0.01	0.01	0.27	<0.01	4.59
52	0.00	0.01	0.01	<0.01	0.02	<0.01	0.03	0.71	1.18	1.41	0.22	0.31	0.22	0.10	0.22	0.01	4.44
71	0.00	0.01	0.01	<0.01	0.01	<0.01	0.03	0.50	0.37	0.53	0.04	0.51	0.35	0.15	0.06	0.01	2.58
81	0.00	0.01	0.03	0.01	0.02	<0.01	0.01	0.48	0.06	0.05	0.34	0.46	8.29	1.65	0.01	<0.01	11.41
82	0.00	0.02	0.03	0.01	0.01	<0.01	0.02	0.21	0.04	0.03	0.23	0.26	2.07	11.79	0.02	<0.01	14.75
90	0.00	0.05	0.02	<0.01	0.01	<0.01	0.01	0.70	1.07	0.37	0.10	0.15	0.02	0.05	5.37	0.15	8.07
95	0.00	0.10	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.13	0.04	0.03	0.08	0.04	0.04	0.38	1.10	1.99
Total	0.00	7.32	3.15	1.53	4.59	0.30	0.38	26.56	8.10	10.77	1.09	2.39	11.13	13.92	7.43	1.34	100.00

Sum on the Diagonal = 66.75%.

Table 10. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Midwestern U.S. (km²).

LANDFIRE EVT Map Classes Cross-walked to NLCD																	
NLCD Map Classes	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	Total
0	0	94	0	0	0	0	0	<1	<1	<1	<1	<1	0	<1	<1	<1	95
11	0	182,718	18	10	6	1	275	189	71	73	141	805	147	569	495	626	186,143
21	0	141	46,780	0	46,012	0	127	0	0	0	0	0	0	0	0	0	93,061
22	0	40	1,108	16,609	12,303	0	46	0	0	0	0	0	0	0	0	0	30,105
23	0	34	0	0	13,376	0	60	0	0	0	0	0	0	0	0	0	13,470
24	0	15	0	0	1,049	3,747	33	0	0	0	0	0	0	0	0	0	4,843
31	0	379	44	35	29	9	7,567	109	17	55	310	441	130	199	53	19	9,396
41	0	420	355	16	131	<1	92	147,249	2,366	13,728	2,265	5,450	929	1,516	11,490	1,317	187,324
42	0	181	33	4	9	<1	10	6,618	18,083	16,575	2,816	1,923	40	156	2,981	145	49,575
43	0	71	16	2	6	<1	12	9,873	3,370	4,250	105	316	23	70	1,919	131	20,163
52	0	225	99	13	19	<1	2,246	9,098	7,494	12,968	212,914	75,322	3,712	9,358	4,635	519	338,624
71	0	890	229	60	68	2	1,168	12,315	3,168	7,952	45,852	556,248	12,161	45,235	4,368	7,341	697,056
81	0	93	340	51	70	2	42	4,751	123	110	6,155	41,285	95,174	48,647	151	103	197,100
82	0	296	334	65	74	2	197	5,776	160	137	5,468	65,467	38,411	613,740	153	236	730,516
90	0	669	145	10	30	<1	70	11,806	8,625	15,815	1,287	1,670	298	780	43,583	3,127	87,914
95	0	2,209	20	5	4	<1	117	3,202	548	477	674	5,312	551	3,737	8,535	15,356	40,746
Total	0	188,473	49,522	16,880	73,184	3,764	12,060	210,987	44,026	72,140	277,987	754,238	151,577	724,006	78,364	28,922	2,686,130

Sum on the Diagonal 1,977,396 km² of the 2,686,130 km² (73.62%).

Table 11. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Midwestern U.S. (Percent).

LANDFIRE EVT Map Classes Cross-walked to NLCD																Total	
NLCD Map Classes	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
0	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01
11	0.00	6.80	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	0.03	0.01	0.02	0.02	0.02	6.93
21	0.00	0.01	1.74	0000	1.71	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46
22	0.00	<0.01	0.04	0.62	0.46	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
23	0.00	<0.01	0.00	0.00	0.50	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
24	0.00	<0.01	0.00	0.00	0.04	0.14	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
31	0.00	0.01	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	<0.01	<0.01	0.01	0.02	<0.01	0.01	<0.01	<0.01	0.35
41	0.00	0.02	0.01	<0.01	<0.01	<0.01	<0.01	5.48	0.09	0.51	0.08	0.20	0.03	0.06	0.43	0.05	6.97
42	0.00	0.01	<0.01	<0.01	<0.01	0.00	<0.01	0.25	0.67	0.62	0.10	0.07	<0.01	0.01	0.11	0.01	1.85
43	0.00	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	0.37	0.13	0.16	<0.01	0.01	<0.01	<0.01	0.07	<0.01	0.75
52	0.00	0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.34	0.28	0.48	7.93	2.80	0.14	0.35	0.17	0.02	12.61
71	0.00	0.03	0.01	<0.01	<0.01	<0.01	0.04	0.46	0.12	0.30	1.71	20.71	0.45	1.68	0.16	0.27	25.95
81	0.00	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.18	<0.01	<0.01	0.23	1.54	3.54	1.81	0.01	<0.01	7.34
82	0.00	0.01	0.01	<0.01	<0.01	<0.01	0.01	0.22	0.01	0.01	0.20	2.44	1.43	22.85	0.01	0.01	27.20
90	0.00	0.02	0.00	<0.01	<0.01	<0.01	<0.01	0.44	0.32	0.59	0.05	0.06	0.01	0.03	1.62	0.12	3.27
95	0.00	0.08	<0.01	<0.01	<0.01	0.00	<0.01	0.12	0.02	0.02	0.03	0.20	0.02	0.14	0.32	0.57	1.52
Total	0.00	7.02	1.84	0.63	2.72	0.14	0.45	7.85	1.64	2.69	10.35	28.08	5.64	26.95	2.92	1.08	100.00

Sum on the Diagonal 73.62%.

Table 12. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Western U.S. (km²).

LANDFIRE EVT Map Classes Cross-walked to NLCD																		
NLCD Map Classes	0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95	Total
0	571	0	0	0	0	0	0	<1	<1	<1	<1	<1	<1	<1	<1	0	0	571
11	50,697	1	1	<1	<1	<1	594	4	101	6	404	201	33	110	218	38	52,409	
12	<1	1,439	0	0	0	<1	0	<1	0	<1	<1	<1	0	0	0	0	0	1,439
21	86	<1	19,860	0	16,190	0	43	0	0	0	0	0	0	0	0	0	0	36,180
22	48	<1	445	11,876	7,465	0	55	0	0	0	0	0	0	0	0	0	0	19,888
23	40	<1	0	0	13,790	0	85	0	0	0	0	0	0	0	0	0	0	13,916
24	19	<1	0	0	836	2,539	24	0	0	0	0	0	0	0	0	0	0	3,419
31	2,229	189	4	<1	1	<1	76,771	6	417	21	276	836	14	59	88	3	80,916	
41	24	0	18	<1	22	<1	117	17,711	9,143	6,112	7,049	1,223	10	49	1,505	32	43,016	
42	467	5	98	<1	32	<1	4,913	8,381	535,444	16,548	15,288	22,623	19	91	17,920	175	622,004	
43	24	0	29	<1	5	<1	32	999	13,547	5,532	1,079	1,168	3	10	1,374	7	23,810	
52	1,057	19	158	1	48	1	73,649	8,394	144,561	7,111	815,806	211,834	616	6,809	22,683	774	1,293,521	
71	327	82	52	1	12	<1	15,747	1,329	27,357	2,065	148,016	202,409	634	8,460	5,830	557	412,879	
81	84	0	5	<1	3	<1	79	137	301	35	6,058	6,663	15,056	18,497	122	84	47,125	
82	155	0	5	<1	1	<1	106	35	163	61	6,346	15,307	12,250	109,018	70	20	143,538	
90	941	0	34	<1	5	<1	52	466	2,423	266	2,383	1,667	142	445	7,890	522	17,237	
95	1,089	0	2	3	1	<10	148	150	779	41	2,702	2,879	503	880	2,824	1,215	13,216	
Total	57,859	1,737	20,713	11,883	38,414	2,541	172,415	37,612	734,236	37,797	1,005,408	466,809	29,280	144,427	60,524	3,427	2,825,084	

Sum on the Diagonal 1,887,052 km² of the 2,825,084 km² (66.80%).

Table 13. Spatially explicit comparison between the NLCD 2011 and LANDFIRE EVT 2010 for the Western U.S. (Percent).

LANDFIRE EVT Map Classes Cross-walked to NLCD																	Total	
NLCD Map Classes	0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
0	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
11	0.00	1.79	0.00	<0.01	0.00	0.00	0.00	0.02	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01	1.86
12	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
21	0.00	<0.01	0.00	0.70	0.00	0.57	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28
22	0.00	<0.01	0.00	0.02	0.42	0.26	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
23	0.00	<0.01	0.00	0.00	0.00	0.49	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49
24	0.00	<0.01	0.00	0.00	0.00	0.03	0.09	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
31	0.00	0.08	0.01	<0.01	0.00	0.00	0.00	2.72	<0.01	0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	<0.01	2.86
41	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.63	0.32	0.22	0.25	0.04	<0.01	<0.01	0.05	<0.01	1.52
42	0.00	0.01	<0.01	<0.01	0.00	<0.01	0.00	0.17	0.30	18.95	0.59	0.54	0.81	<0.01	<0.01	0.63	0.01	22.02
43	0.00	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01	0.04	0.48	0.20	0.04	0.04	<0.01	<0.01	0.05	<0.01	0.84
52	0.00	0.04	<0.01	0.01	0.00	<0.01	0.00	2.61	0.30	5.12	0.25	28.88	7.50	0.02	0.24	0.80	0.03	45.79
71	0.00	0.01	<0.01	<0.01	0.00	<0.01	0.00	0.56	0.05	0.97	0.07	5.24	7.16	0.02	0.30	0.21	0.02	14.61
81	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.00	<0.01	<0.01	0.01	<0.01	0.21	0.24	0.53	0.65	<0.01	<0.01	1.67
82	0.00	0.01	0.00	<0.01	0.00	0.00	0.00	<0.01	<0.01	0.01	<0.01	0.22	0.54	0.43	3.86	<0.01	<0.01	5.08
90	0.00	0.03	0.00	<0.01	0.00	<0.01	0.00	<0.01	0.02	0.09	0.01	0.08	0.06	0.01	0.02	0.28	0.02	0.61
95	0.00	0.04	0.00	<0.01	<0.01	0.00	0.00	0.01	0.01	0.03	<0.01	0.10	0.10	0.02	0.03	0.10	0.04	0.47
Total	0.00	2.05	0.06	0.73	0.42	1.36	0.09	6.10	1.33	25.99	1.34	35.59	16.5237	1.0364	5.11	2.1424	0.12	100.00

Sum on the Diagonal 66.80%.

Table 14. Per class agreement conditioned on the row totals (NLCD) for the Conterminous U.S. (Percent).

NLCD Map Classes

LANDFIRE EVT Map Classes Cross-walked to NLCD																	Total	
	0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95	Total
0	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.00	0.00	0.00	100
11		97.92	<0.01	0.02	0.01	0.01	<0.01	0.28	0.10	0.11	0.07	0.14	0.27	0.08	0.24	0.33	0.42	100
12		<0.01	99.98	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
21	0.17	<0.01	53.59	0.00	46.08	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
22	0.20	<0.01	3.57	56.83	39.13	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
23	0.34	<0.01	0.00	0.00	99.02	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
24	0.53	<0.01	0.00	0.00	22.51	76.02	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
31	3.63	0.19	0.16	0.13	0.13	0.06	89.47	1.05	0.76	0.44	0.65	1.92	0.44	0.56	0.31	0.11	0.11	100
41	0.14	<0.01	0.12	0.01	0.07	<0.01	0.12	79.71	2.91	10.09	1.23	1.50	0.36	0.44	3.11	0.18	0.18	100
42	0.10	<0.01	0.05	0.01	0.04	<0.01	0.59	5.47	70.26	14.05	2.08	3.41	0.11	0.10	3.67	0.06	0.06	100
43	0.16	<0.01	0.11	0.01	0.11	<0.01	0.08	33.80	21.38	35.14	0.94	1.66	0.09	0.15	6.25	0.11	0.11	100
52	0.09	<0.01	0.04	<0.01	0.03	<0.01	4.38	2.04	10.44	3.22	59.23	16.91	0.56	1.08	1.88	0.09	0.09	100
71	0.12	0.01	0.05	0.01	0.02	<0.01	1.51	2.26	3.40	2.01	16.57	65.62	1.84	4.89	1.00	0.70	0.70	100
81	0.07	<0.01	0.21	0.04	0.12	<0.01	0.07	3.20	0.37	0.26	3.87	11.11	60.16	20.36	0.12	0.04	0.04	100
82	0.08	<0.01	0.08	0.02	0.03	<0.01	0.06	0.89	0.11	0.08	1.42	6.98	8.29	81.87	0.06	0.03	0.03	100
90	0.91	<0.01	0.19	0.02	0.06	<0.01	0.12	9.71	12.35	8.15	2.03	2.34	0.33	0.78	60.62	2.38	2.38	100
95	5.68	<0.01	0.13	0.07	0.03	<0.01	0.42	4.19	4.41	1.51	3.97	9.78	1.90	5.27	20.01	42.63	100	

Table 15. Per class agreement conditioned on the column totals (LANDFIRE) for the Conterminous U.S. (Percent).

		LANDFIRE EVT Classes Cross-walked to NLCD Map																
		0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95
NLCD Map Classes	0	0.63	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
	11	94.74	0.07	0.04	0.07	0.02	0.07	0.60	0.05	0.05	0.07	0.05	0.09	0.08	0.08	0.41	2.67	
	12	0.00	82.86	0.00	0.00	0.00	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	21	0.10	<0.01	93.26	0.00	52.86	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	22	0.05	<0.01	2.78	98.22	20.07	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	23	0.04	<0.01	0.00	0.00	23.79	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	24	0.02	<0.01	0.00	0.00	1.78	99.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	31	0.83	10.86	0.10	0.18	0.06	0.45	45.80	0.11	0.08	0.11	0.05	0.15	0.09	0.05	0.09	0.17	
	41	0.28	<0.01	0.69	0.14	0.29	0.02	0.55	75.03	2.59	22.86	0.82	1.02	0.68	0.31	8.28	2.35	
	42	0.22	0.32	0.30	0.09	0.16	0.01	2.82	5.49	66.53	33.95	1.48	2.48	0.21	0.08	10.41	0.80	
	43	0.06	<0.01	0.12	0.03	0.08	0.00	0.07	5.88	3.51	14.71	0.12	0.21	0.03	0.02	3.07	0.27	
	52	0.34	1.12	0.41	0.13	0.24	0.03	39.41	3.83	18.48	14.55	78.88	23.02	2.11	1.53	9.97	2.44	
	71	0.32	4.73	0.40	0.25	0.10	0.07	9.12	2.85	4.05	6.11	14.86	60.18	4.64	4.69	3.56	12.38	
	81	0.08	0.00	0.75	0.34	0.28	0.09	0.19	1.85	0.20	0.36	1.59	4.65	69.26	8.93	0.19	0.35	
	82	0.25	<0.01	0.67	0.34	0.19	0.08	0.37	1.19	0.13	0.27	1.36	6.82	22.24	83.66	0.22	0.48	
	90	0.66	0.02	0.39	0.09	0.08	0.01	0.19	3.26	3.91	6.59	0.48	0.57	0.22	0.20	57.43	11.13	
	95	1.37	<0.01	0.09	0.10	0.02	0.02	0.23	0.47	0.47	0.41	0.32	0.80	0.43	0.45	6.37	66.96	
Total		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Table 16. Per class agreement conditioned on the row totals (NLCD) for the Eastern U.S. (Percent).

NLCD Map Classes

LANDFIRE EVT Classes Cross-walked to NLCD Map																Total	
	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	Total
0	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
11		98.01	0.03	0.02	0.02	<0.01	0.16	0.13	0.16	0.11	0.03	0.07	0.10	0.19	0.36	0.62	100
21		0.16	55.55	0.00	44.10	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
22		0.22	3.91	56.73	38.82	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
23		0.41	0.00	0.00	98.85	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
24		0.62	0.00	0.00	22.26	75.97	1.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
31		10.97	1.18	0.99	1.06	0.58	50.78	10.18	3.47	3.97	0.70	6.89	3.20	3.28	1.78	0.97	100
41		0.12	0.10	0.01	0.08	<0.01	0.13	82.60	2.17	10.61	0.22	1.00	0.34	0.35	2.21	0.03	100
42		0.12	0.12	0.02	0.13	<0.01	0.22	13.75	39.16	37.38	0.50	2.77	0.36	0.27	5.11	0.08	100
43		0.14	0.11	0.02	0.14	0.00	0.07	37.18	15.00	39.95	0.28	1.03	0.10	0.15	5.79	0.04	100
52		0.19	0.31	0.06	0.42	<0.01	0.59	15.89	26.48	31.68	4.98	7.07	4.85	2.30	4.88	0.30	100
71		0.27	0.49	0.17	0.22	0.01	1.23	19.47	14.27	20.50	1.50	19.89	13.39	5.72	2.31	0.57	100
81		0.06	0.27	0.06	0.20	<0.01	0.08	4.20	0.53	0.42	2.94	4.00	72.67	14.43	0.12	0.02	100
82		0.16	0.18	0.04	0.09	<0.01	0.11	1.40	0.27	0.22	1.59	1.78	14.03	79.97	0.13	0.02	100
90		0.60	0.20	0.03	0.08	<0.01	0.12	8.71	13.29	4.53	1.30	1.91	0.28	0.59	66.55	1.83	100
95		5.22	0.22	0.12	0.06	<0.01	0.35	2.04	6.47	2.09	1.54	4.07	1.84	1.79	18.91	55.25	100

Table 17. Per class agreement conditioned on the column totals (LANDFIRE) for the Eastern U.S. (Percent).

		LANDFIRE EVT Classes Cross-walked to NLCD Map															
		0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95
NLCD Map Classes	0	0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	11		94.72	0.06	0.10	0.02	0.12	2.99	0.03	0.14	0.07	0.19	0.21	0.06	0.09	0.34	3.25
	21		0.12	91.86	0.00	50.14	0.00	2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22		0.08	3.27	97.63	22.30	0.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	23		0.06	0.00	0.00	23.27	0.00	2.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	24		0.03	0.00	0.00	1.87	98.72	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	31		0.53	0.13	0.23	0.08	0.69	47.28	0.14	0.15	0.13	0.23	1.02	0.10	0.08	0.09	0.26
	41		0.40	0.82	0.20	0.42	0.03	8.77	78.18	6.74	24.78	5.18	10.49	0.78	0.64	7.49	0.65
	42		0.17	0.40	0.15	0.28	0.01	5.75	5.29	49.37	35.47	4.72	11.83	0.33	0.20	7.03	0.62
	43		0.09	0.17	0.05	0.14	0.00	0.85	6.42	8.49	17.03	1.19	1.97	0.04	0.05	3.57	0.13
	52		0.11	0.44	0.19	0.40	0.04	6.86	2.66	14.52	13.08	20.31	13.13	1.93	0.74	2.92	0.98
	71		0.09	0.40	0.29	0.12	0.10	8.28	1.89	4.55	4.91	3.55	21.46	3.11	1.06	0.80	1.09
	81		0.10	0.97	0.45	0.49	0.12	2.53	1.80	0.74	0.45	30.73	19.10	74.52	11.83	0.19	0.14
	82		0.33	0.82	0.42	0.30	0.12	4.33	0.78	0.48	0.30	21.49	10.96	18.59	84.72	0.27	0.19
	90		0.66	0.51	0.13	0.13	0.02	2.51	2.65	13.23	3.39	9.59	6.45	0.20	0.34	72.24	10.99
	95		1.42	0.14	0.16	0.03	0.04	1.84	0.15	1.59	0.38	2.81	3.38	0.33	0.25	5.05	81.71
		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Table 18. Per class agreement conditioned on the row totals (NLCD) for the Midwestern U.S. (Percent).

LANDFIRE EVT Classes Cross-walked to NLCD Map																	Total
	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
NLCD Map Classes	0	0.0	99.96	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.01	0.01	<0.01	100
	11	98.16	0.01	0.01	<0.01	<0.01	0.15	0.10	0.04	0.04	0.08	0.43	0.08	0.31	0.27	0.34	100
	21	0.15	50.27	0.00	49.44	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
	22	0.13	3.68	55.17	40.86	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
	23	0.25	0.00	0.00	99.30	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
	24	0.31	0.00	0.00	21.65	77.37	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100
	31	4.03	0.47	0.37	0.31	0.10	80.53	1.16	0.18	0.58	3.30	4.69	1.39	2.12	0.57	0.20	100
	41	0.22	0.19	0.01	0.07	<0.01	0.05	78.61	1.26	7.33	1.21	2.91	0.50	0.81	6.13	0.70	100
	42	0.36	0.07	0.01	0.02	<0.01	0.02	13.35	36.48	33.43	5.68	3.88	0.08	0.32	6.01	0.29	100
	43	0.35	0.08	0.01	0.03	<0.01	0.06	48.96	16.71	21.08	0.52	1.57	0.12	0.35	9.52	0.65	100
	52	0.07	0.03	<0.01	0.01	<0.01	0.66	2.69	2.21	3.83	62.88	22.24	1.10	2.76	1.37	0.15	100
	71	0.13	0.03	0.01	0.01	<0.01	0.17	1.77	0.45	1.14	6.58	79.80	1.74	6.49	0.63	1.05	100
	81	0.05	0.17	0.03	0.04	<0.01	0.02	2.41	0.06	0.06	3.12	20.95	48.29	24.68	0.08	0.05	100
	82	0.04	0.05	0.01	0.01	<0.01	0.03	0.79	0.02	0.02	0.75	8.96	5.26	84.01	0.02	0.03	100
	90	0.76	0.17	0.01	0.03	<0.01	0.08	13.43	9.81	17.99	1.46	1.90	0.34	0.89	49.57	3.56	100
	95	5.42	0.05	0.01	0.01	<0.01	0.29	7.86	1.35	1.17	1.65	13.04	1.35	9.17	20.95	37.69	100

Table 19. Per class agreement conditioned on the column totals (LANDFIRE) for the Midwestern U.S. (Percent).

LANDFIRE EVT Classes Cross-walked to NLCD Map																
NLCD Map Classes	0	11	21	22	23	24	31	41	42	43	52	71	81	82	90	95
0	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	96.95	0.04	0.06	0.01	0.02	2.28	0.09	0.16	0.10	0.05	0.11	0.10	0.08	0.63	2.17	
21	0.07	94.46	0.00	62.87	0.00	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.02	2.24	98.40	16.81	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.02	0.00	0.00	18.28	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.01	0.00	0.00	1.43	99.54	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.20	0.09	0.21	0.04	0.25	62.74	0.05	0.04	0.08	0.11	0.06	0.09	0.03	0.07	0.07	
41	0.22	0.72	0.09	0.18	0.01	0.76	69.79	5.38	19.03	0.81	0.72	0.61	0.21	14.66	4.55	
42	0.10	0.07	0.02	0.01	0.00	0.08	3.14	41.07	22.98	1.01	0.25	0.03	0.02	3.80	0.50	
43	0.04	0.03	0.01	0.01	0.00	0.10	4.68	7.65	5.89	0.04	0.04	0.02	0.01	2.45	0.45	
52	0.12	0.20	0.08	0.03	0.01	18.62	4.31	17.02	17.98	76.59	9.99	2.45	1.29	5.92	1.80	
71	0.47	0.46	0.36	0.09	0.05	9.68	5.84	7.19	11.02	16.49	73.75	8.02	6.25	5.57	25.38	
81	0.05	0.69	0.30	0.10	0.06	0.35	2.25	0.28	0.15	2.21	5.47	62.79	6.72	0.19	0.36	
82	0.16	0.67	0.39	0.10	0.06	1.63	2.74	0.36	0.19	1.97	8.68	25.34	84.77	0.20	0.82	
90	0.35	0.29	0.06	0.04	0.01	0.58	5.60	19.59	21.92	0.46	0.22	0.20	0.11	55.62	10.81	
95	1.17	0.04	0.03	0.00	0.00	0.97	1.52	1.25	0.66	0.24	0.70	0.36	0.52	10.89	53.09	
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Table 20. Per class agreement conditioned on the row totals (NLCD) for the Western U.S. (Percent).

LANDFIRE EVT Classes Cross-walked to NLCD Map																	Total
0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95	
0	0	100.00	0.00	0	0	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00	100
11		96.73	<0.01	<0.01	<0.01	<0.01	<0.01	1.13	0.01	0.19	0.01	0.77	0.38	0.06	0.21	0.42	0.07
12		0.00	99.98	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	<0.01	0.00	0.00	0.00	0.00	0.00
21		0.24	<0.01	54.89	0.00	44.75	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22		0.24	<0.01	2.24	59.71	37.53	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23		0.29	<0.01	0.00	0.00	99.10	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24		0.57	<0.01	0.00	0.00	24.46	74.27	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31		2.76	0.23	0.00	<0.01	<0.01	<0.01	94.88	0.01	0.52	0.03	0.34	1.03	0.02	0.07	0.11	0.00
41		0.06	<0.01	0.04	<0.01	0.05	<0.01	0.27	41.17	21.26	14.21	16.39	2.84	0.02	0.11	3.50	0.08
42		0.08	<0.01	0.02	<0.01	0.01	<0.01	0.79	1.35	86.08	2.66	2.46	3.64	0.00	0.01	2.88	0.03
43		0.10	<0.01	0.12	<0.01	0.02	<0.01	0.13	4.19	56.90	23.23	4.53	4.91	0.01	0.04	5.77	0.03
52		0.08	<0.01	0.01	<0.01	<0.01	<0.01	5.69	0.65	11.18	0.55	63.07	16.38	0.05	0.53	1.75	0.06
71		0.08	0.02	0.01	<0.01	<0.01	<0.01	3.81	0.32	6.63	0.50	35.85	49.02	0.15	2.05	1.41	0.13
81		0.18	<0.01	0.01	<0.01	0.01	<0.01	0.17	0.29	0.64	0.07	12.86	14.14	31.95	39.25	0.26	0.18
82		0.11	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	0.02	0.11	0.04	4.42	10.66	8.53	75.95	0.05	0.01
90		5.46	<0.01	0.20	<0.01	0.03	<0.01	0.30	2.70	14.06	1.54	13.83	9.67	0.82	2.58	45.77	3.03
95		8.24	<0.01	0.01	0.02	0.01	<0.01	1.12	1.14	5.89	0.31	20.45	21.79	3.81	6.66	21.37	9.19

Table 21. Per class agreement conditioned on the column totals (LANDFIRE) for the Western U.S. (Percent).

		LANDFIRE EVT Classes Cross-walked to NLCD Map																
		0	11	12	21	22	23	24	31	41	42	43	52	71	81	82	90	95
NLCD Map Classes	0	0.99	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00
	11	87.62	0.07	0.01	<0.01	<0.01	0.34	0.01	0.01	0.01	0.01	0.04	0.04	0.11	0.08	0.36	1.10	
	12	<0.01	82.86	0.00	0.00	0.00	0.00	0.00	<0.01	0.00	<0.01	<0.01	<0.01	0.00	0.00	0.00	0.00	0.00
	21	0.15	0.00	95.88	0.00	42.15	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22	0.08	0.00	2.15	99.94	19.43	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	23	0.07	0.00	0.00	0.00	35.90	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	24	0.03	0.00	0.00	0.00	2.18	99.95	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	31	3.85	10.86	0.02	<0.01	<0.01	0.01	44.53	0.02	0.06	0.06	0.03	0.18	0.05	0.04	0.15	0.09	
	41	0.04	0.00	0.09	<0.01	0.06	<0.01	0.07	47.09	1.25	16.17	0.70	0.26	0.03	0.03	2.49	0.95	
	42	0.81	0.32	0.47	<0.01	0.08	<0.01	2.85	22.28	72.93	43.78	1.52	4.85	0.07	0.06	29.61	5.09	
	43	0.04	0.00	0.14	<0.01	0.01	<0.01	0.02	2.66	1.85	14.64	0.11	0.25	0.01	0.01	2.27	0.21	
	52	1.83	1.12	0.76	0.01	0.13	0.02	42.72	22.32	19.69	18.81	81.14	45.38	2.10	4.71	37.48	22.58	
	71	0.57	4.73	0.25	<0.01	0.03	0.01	9.13	3.53	3.73	5.46	14.72	43.36	2.17	5.86	9.63	16.25	
	81	0.15	<0.01	0.03	<0.01	0.01	<0.01	0.05	0.36	0.04	0.09	0.60	1.43	51.42	12.81	0.20	2.45	
	82	0.27	<0.01	0.03	<0.01	0.00	<0.01	0.06	0.09	0.02	0.16	0.63	3.28	41.84	75.48	0.12	0.59	
	90	1.63	0.02	0.16	<0.01	0.01	<0.01	0.03	1.24	0.33	0.70	0.24	0.36	0.49	0.31	13.04	15.24	
	95	1.88	0.00	0.01	0.03	0.00	<0.01	0.09	0.40	0.11	0.11	0.27	0.62	1.72	0.61	4.67	35.44	
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

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Appendix 1. Crosswalk of LANDFIRE Existing Vegetation Types to National Land Cover Database Classes.



LFEVT_NLCD_LUT.xls

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